

# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/17703

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B23D 45/16  
US CL : 30/388; 173/216,217

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : 30/122,388,389,390,391,517,518,519,520,521,522,523,524; 173/93.5,216,217

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
BRS text search

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X — Y	US 4,060,940 A (DeWITT) 06 December 1977 (06.12.1977), Figures 1-7.	1-3, 6, 8-10, 12-13,, 18-21, 43 ----- 4-5, 7, 11, 14-17, 22, 33-42
Y	US 5,006,740 A (PALM) 09 April 1991 (09.04.1991), Figure 5.	4-5, 14-15, 26, 34-35
X — Y	US 5,023,999 A (LOOPER et al) 18 June 1991 (18.06.1991), Figure 2.	23-25, 28-32 ----- 26-27
A	US 2,989,995 A (HAPPE) 27 June 1961 (27.06.1961), column 2.	
A	US 3,456,696 A (GREGORY et al) 22 July 1969 (22.07.1969), Figure 4.	
A	US 3,873,862 A (BUTLER) 25 March 1975 (25.03.1975), Figure 1.	



Further documents are listed in the continuation of Box C.



See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

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"T"

later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

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document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

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document member of the same patent family

Date of the actual completion of the international search

06 August 2003 (06.08.2003)

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**C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 4,145,811 A (KENDZIOR) 27 March 1979 (27.03.1979), Figure 2.	
A	US 4,516,324 A (HEININGER, Jr. et al) 14 May 1985 (14.05.1985), Figure 1.	
A	US Des. 363,656 S (GIERKE) 31 October 1995 (31.10.1995), Figures 1-2.	
A	US 6,108,916 A (ZEILER et al) 29 August 2000 (29.08.2000), Figure 2.	
A, P	US 6,502,647 B1 (KRZYZEWSKI et al) 07 January 2003 (07.01.2003), Figure 1.	
A, P	US 6,536,120 B1 (LANGIS) 25 March 2003 (25.03.2003), Figure 1.	